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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/614,945	Applicant(s) LU, SHUIJUN	
	Examiner Eric V. Woods	Art Unit 2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 19 July 2005.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-4 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-4 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Remarks pages 1-5, filed 19 July 2005, with respect to the various objections and rejections have been fully considered and are persuasive in view of applicant's arguments and amendments. Therefore, the rejection has been withdrawn.

The rejection of claim 3 under 35 U.S.C. 112, second paragraph, is withdrawn in view of applicant's amendments.

The objections to the specification and requirements concerning inventorship are withdrawn in view of applicant's remarks on pages 1-2 and applicant's amendments to the specification, as these have satisfied such a requirement.

The rejections of claims 1-4 under 35 U.S.C. 103(a) over Crisu in view of Foley are withdrawn.

However, upon further consideration, a new ground(s) of rejection is made in view of various references as below.

Specification

The abstract of the disclosure is objected to because it is in some ways a repetition of claim 1, and is not in narrative form. Further, it does not provide any explanation of how the claimed invention is actually applied. That is, one of ordinary skill in the art would not understand what was being done and the meaning of the parameters without having to read the entire specification. The abstract should be

sufficient that a reading of it conveys the essence of the invention, where now the abstract simply does not do so. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-4 are rejected under 35 U.S.C. 101 because it is directed to non-statutory subject matter. That is, claim 1 recites an abstract idea that manipulates mathematical formulas only. This is not a declaration of failure to comply with the older, superceded Abele-Freeman-Walker test; rather, it is a statement that the method, as filed, has no practical application. The preamble is only a recitation of intended use, which while possibly sufficient to operate to protect the claim against a utility rejection certainly does not provide it with protection against failing the standard tests of patentability. The claim does not perform pre- or post-computer activity, so it fails the standard safe harbor tests under *AT&T v. Excel Communications, State Street*, and the like. Secondly, the results of the method are that a parameter, **which exists only within a digital computer**, is incremented. This parameter has nothing to do with any practical application and does not increase the efficiency of operation of the computer (*In re Lowry*). Therefore, the claim only manipulates abstract ideas in the form of bits within a general-purpose digital computer (assuming, of course, that the claim is properly limited to a digital computer, which it is not). Therefore, there are simply no safe harbors where the instant claim falls. It must have a practical application – that is,

the results of the computer operation must produce a "concrete, tangible, and practical" result.

Further, the claim is not technologically embodied, that is a mental process in a human being anticipates it, as noted below. Such is also proof that the claim constitutes 'mental steps'. Specifically, a scan line could be two squares on a piece of paper, and a mental process in the human being would perform the steps and increment a variable (e.g. writing on the piece of paper) or merely incrementing a variable in the mind of said human being.

Specifically, in claims 2-4 even though pixels are filled, still the claims are merely directed to abstract ideas. In order for the claims to be statutory, the pixels must be **shown to a user, or displayed on a display device**, in such a way that post-computer process activity takes place.

Therefore, in order to correct the above deficiencies, applicant needs to do the following: incorporate claim 2 into claim 1, thus providing a result of the process, and the resultant claim as well as clam 4 need to be amended to recite that they display the end result to a user on some sort of display device.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-4 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter that was not

described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Specifically, this rejection follows the logic used in the CAFC (CCPA) case *In re Prater*. Specifically, there is nothing **in the claim** that limits the claim to a "machine process" or a "machine-implemented" process, as the discussion of *Prater* with respect to claim 9. The CCPA upheld the Board's rejection that the claims read on a mental process in a human being performing the recited steps.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, this rejection follows the logic used in the CAFC (CCPA) case *In re Prater*. Specifically, there is nothing **in the claim** that limits the claim to a "machine process" or a "machine-implemented" process, as the discussion of *Prater* with respect to claim 9. The CCPA upheld the Board's rejection that the claims read on a mental process in a human being performing the recited steps. Therefore, they are not statutory and fail the tests that the CCPA set in *Prater*, and do not point and distinctly claim the invention. Now, if applicant amended the preamble to read "computer-implemented", this would obviate both the rejections under 35 U.S.C. 112, first and second paragraphs, and under 35 U.S.C. 102(b) below.

Specifically, the claims are inherently contradictory after applicant's amendments. For example, the preamble of claim 1 reads after amendment, *inter alia*, "A method for determining fill styles for pixels **without any edges** ..." where clearly the first line in the body of the claim states "for each edge in the first pixel ..." This is inherently contradictory. The claim makes no sense with this addition. Further, applicant's own specification further teaches that pixels that have no edges have no need of determining a fill style (see applicant's own Remarks pages 2-4, Figures 11A-12, and paragraphs [0142-0149] of the specification. Specifically, pixels numbered 2, 3, 5, and 8 that have no edges have a set fill style, and there is no need to determine.

However, it is possible that applicant is intending to make it more clear that the intended fill style fa is set by using the pixels with the edges via the calculations recited in the rest of the claim, but applicant needs to amend the claim to bring this forward. As currently written, anyone reading the claims would not understand the point that applicant is trying to make here, as it is a subtle distinction, if that is applicant's intention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 are rejected under 35 U.S.C. 102(b) as being a mental process in a human being augmented by a pencil and paper (*In re Prater* doctrine – see MPEP 2111

[R-2] and the case itself, and as discussed in the 112 rejections above). Specifically, a scan line could be two squares on a piece of paper, and a mental process in the human being would perform the steps and increment a variable (e.g. writing on the piece of paper) or merely incrementing a variable in the mind of said human being.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamae et al ("Compositing 3D Images with Antialiasing and Various Shading Effects.") with Wells et al (US 5,123,085) and Foley.

As to claim 1,

A method for determining fill styles for pixels without any edges in a scan line, the scan line comprising a first pixel having edges and a second pixel without any edges, the method comprising: (Preamble only recites intended use and is thusly not given any

patentable weight. See *Kropa v. Robie*, *Pitney Bowes v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999), and *Rowe v. Dror*, 112 F.3d 473, 478, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997))

For each edge in the first pixel:

--Determining if each edge touches a bottom border of the first pixel; (The pixel in Nakamae Figure 1 is divided into sub-pixel areas by the creation of virtual scanlines that demarcate sub-pixel portions. As noted in Figure 2, the visible segments are tested to determine which edges cross the virtual scanlines (Figure 2a) and the intersection points are listed as in Figure 2b. This clearly would teach or suggest determining if each (visible) edge touches a bottom border of a pixel, where the bottom of the pixel could constitute a virtual scanline (the border in question being arbitrary and a design choice, it could just as easily be the top or one of the sides; applicant has not provided any evidence to the contrary; Nakamae clearly shows the existence of a first pixel) (Foley clearly shows that in the explanation of the operation of the Bresenham algorithm on page 74 that the first point is taken as (x_0, y0) and that it then moves up the line (e.g. each pixel is determined as shown in Fig. 3.5 based on the intersection with the actual pixel lines, and that on pages 75-76 that the algorithm as shown in Fig. 3.6 makes decision based on whether or not the edges cross the boundaries of the pixel – in some cases, the side boundaries, and in others, the top and bottom of the pixel, depending on whether or not the line had a slope greater or less than 1, such that any line that was written in x terms (e.g. instead of y = m * x + b, the line was written as x = m * y + b, the slope used in standard form would thus be 1/m such that it was fractional,

and such a line would be evaluated in terms of intersections with the top and bottom (border) of the pixel, as on pages 94-96 of Foley. On pages 96-97 in section 3.6.3, it is clearly set forth that the denominator would have a fractional part, and when the fractional part is zero, the pixel can be drawn, but that when it is nonzero that rounding must occur, as in the Bresenham algorithm. As such, this determination of the fraction – e.g. the determination of the intersection with the line, since determination of an x-coordinate with respect to a pixel only makes sense if the edge is evaluated for crossing the pixel in the first place, thusly accounting for the "determining" step as recited above.)

> --For each edge that touches the bottom border of the first pixel, incrementing a first parameter by a difference between a left fill style and a right fill style of the edge, wherein the leftmost fill style in the scan line is set to null (Nakamae clearly teaches this limitation, as on page 24 where the algorithm is shown, whereby each intersection of an edge with the virtual scanline is processed as recited above. However, Nakamae does not precisely detail the filling process)(Wells teaches filling polygons as in Figure 2b, with the pixels having no edges between edges being filled with the color of the polygon as from a first pixel, as in 1:1-2:50 where the Bresenham algorithm for filling polygons is taught, where the left fill style is taken from the right fill style)(Foley clearly teaches on pages 95-96 that the values are incremented as the algorithm moves up the line, just as Bresenham suggests, but it keeps the coordinates without rounding them except as needed to make the judgment to which pixel the number should

be rounded to, e.g. the rounding is done on the precise value, but the precise value is retained by the system such that once it is incremented, it can be checked again. On pages 95-96 in section 3.6.2 it is taught that slivers present a problem, and suggests on page 96 that a rule such as "draw only pixels that lie interior or on a left or bottom edge" (in this case the case of the bottom pixels is emphasized) would fulfill the recited limitation. Further, on pages 92-94, section 3.6 specifically, the use of a polygon filling algorithm that avoids problems with polygons overwriting each other's pixels is taught an clarified in the context of the Bresenham / midpoint algorithm (pages 96-98).)

Nakamae teaches most of the limitations of claim, particularly those dealing with the intersections of multiple edges within one pixel and overcomes applicant's arguments that the references do not teach the recited limitation. Motivation for combination with Wells is taken from the fact that Wells teaches additional details on scan-converting virtual scanlines at a subpixel level in polygons that Nakamae is silent about (namely, the Bresenham algorithm) that are known to be computationally efficient (see Foley 92-98, Wells 1:1-2:50, 4:55-5:60, and the like)). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the techniques of Wells (and by extension Foley, which Wells incorporates, so no motivation is needed for that reference) with that of Nakamae since Nakamae is silent on the actual scan-conversion algorithms for the virtual scanlines at a sub-pixel level.

As to claim 2, this claim merely recites the changing of a second parameter that clearly could represent changing the other coordinate of the pixel (e.g. the first parameter recited above could be the x-coordinate and the second parameter recited herein could be the y-coordinate). Also, as set forth in the filling algorithm recited in section 3.6 of Foley (pgs. 92-94), clearly the second fill style recited would be that of the area outside the polygon, since obviously the fill style in question is merely the color or texture of pixels inside of one polygon in for example Figs. 3.22 and 3.23(a) and (b) as set forth on pages 92-94. Fill style is nothing more and nothing less than the color and characteristics that a polygon or general screen is covered with. Motivation and combination is taken from the parent claim.

As to claim 3, the claim of a third and fourth pixel is comparable to Fig. 3.22 on Foley page 92 (as an example). Namely, scan line 8 is illustrated as crossing a polygon. Obviously, there are at least first and second pixels outside and inside the polygon where the first parameter would be the fill style of the inside of the polygon. The third parameter recited would merely be the coordinates of the edge that intersects the scan line at that point. Applicant's parent claim – claim 1 – states clearly that each scanline has multiple edges. Obviously, such edges would cross the scanline once each, and the third claim thusly requires multiple edges. Thus, each edge would have inside and outside pixels and fill styles, and thusly the recited clause of "for each edge in the third pixel" is nothing more than a recitation of claim 1 for another edge crossing the recited same scanline.

Let the algorithm work as is taught in section 3.6 and as in Wells, as noted above where edge-walking is done for the polygon, such that as on page 92, the scan is walked across, in that each edge that crosses the scanline is noted and the appropriate pixels that belong on it are chosen such that one coordinate is incremented as the algorithm moves across the scanline – obviously, this could be the x or y coordinate (in the case of the image in Fig. 3.22 on page 92 it would the x-coordinate), and obviously the recited third parameter would be the incremental increase in x-position that would be added or incremented to the counter variable holding the x-position on the scanline, which would also the be the recited "second parameter" such that it would mark the occurrence of an edge. Obviously, Fig. 3.22 illustrates that situation where the third pixel would be the point where the scanline crosses the polygon As to claim 3, the claim of a third and fourth pixel is comparable to Fig. 3.22 on Foley page 92 (as an example). Namely, scan line 8 is illustrated as crossing a polygon. Obviously, there are at least first and second pixels outside and inside the polygon where the first parameter would be the fill style of the inside of the polygon. The third parameter recited would merely be the coordinates of the edge that intersects the scan line at that point. Applicant's parent claim – claim 1 – states clearly that each scanline has multiple edges. Obviously, such edges would cross the scanline once each, and the third claim thusly requires multiple edges. Thus, each edge would have inside and outside pixels and fill styles, and thusly the recited clause of "for each edge in the third pixel" is nothing more than a recitation of claim 1 for another edge crossing the recited same scanline. boundary again (e.g. pixels one and two would be found at point a and pixels three and

four would be found at point b) and the fourth pixel would be filled with the "second fill style" that would be equal to the x- and y-coordinates of the scanline, e.g. the recited first fill style would be that of the polygon and the second fill style would be that of the null region or the outside of the polygon as illustrated in Figs. 3.22 and 3.23(a) and (b) and as explained above. Motivation and combination are taken from the parent claim.

As to claim 4, it is merely one claim that contains all the limitations of claims 1-3 above. Therefore, all the limitations of this claim are taught in the rejections to claims 1-3 above, which are herein incorporated by reference in their entirety, and motivation and combination is thusly provided by claim 1 as stated above.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crisu et al (US PGPub 2004/0207642 A1)('Crisu') in view of Foley et al (Foley, J. et al: "Computer Graphics: Principles and Practice") in view of Nakamae.

As to claim 1,

A method for determining fill style for pixels in a scan line, the scan line comprising a first pixel having edges and a second pixel without any edges; the method comprising: (First of all, a computer graphics system that draws edges will inherently have pixels that are crossed by edges and ones that are not, e.g. Crisu [0013-0016] wherein Fig. 1a and 3b)(Foley Fig. 3.4 on page 73, Fig. 3.5 on page 74, et cetera, which show pixels being crossed by edges and others not)

-For each edge in the first pixel: (Crisu clearly teaches the use of edge filling algorithms that have such first pixels, e.g. see Figs. 1-3 and the others in that PGPub)(Foley clearly shows in Figs. 3.4, 3.5, etc. that such first pixels exist)

-Determining if each edge touches a bottom border of the first pixel; (Foley clearly shows that in the explanation of the operation of the Bresenham algorithm on page 74 that the first point is taken as (x_0, y0) and that it then moves up the line (e.g. each pixel is determined as shown in Fig. 3.5 based on the intersection with the actual pixel lines, and that on pages 75-76 that the algorithm as shown in Fig. 3.6 makes decision based on whether or not the edges cross the boundaries of the pixel – in some cases, the side boundaries, and in others, the top and bottom of the pixel, depending on whether or not the line had a slope greater or less than 1, such that any line that was written in x terms (e.g. instead of $y = m * x + b$, the line was written as $x = m * y + b$, the slope used in standard form would thus be 1/m such that it was fractional, and such a line would be evaluated in terms of intersections with the top and bottom (border) of the pixel, as on pages 94-96 of Foley. On pages 96-97 in section 3.6.3, it is clearly set forth that the denominator would have a fractional part, and when the fractional part is zero, the pixel can be drawn, but that when it is nonzero that rounding must occur, as in the Bresenham algorithm. As such, this determination of the fraction – e.g. the determination of the intersection with the line, since determination of an x-coordinate with respect to a pixel only makes sense if the edge is evaluated for crossing the pixel in the first place, thusly accounting for the "determining" step as recited above.)(The pixel in Nakamae Figure 1 is divided into sub-pixel areas by the creation of virtual scanlines

that demarcate sub-pixel portions. As noted in Figure 2, the visible segments are tested to determine which edges cross the virtual scanlines (Figure 2a) and the intersection points are listed as in Figure 2b. This clearly would teach or suggest determining if each (visible) edge touches a bottom border of a pixel, where the bottom of the pixel could constitute a virtual scanline (the border in question being arbitrary and a design choice, it could just as easily be the top or one of the sides; applicant has not provided any evidence to the contrary; Nakamae clearly shows the existence of a first pixel)

-For each edge that touches the bottom border of the first pixel, incrementing a first parameter by a difference between a right fill style and a left till style of the edge, wherein the leftmost fill style in the scan line is set to null. (Foley clearly teaches on pages 95-96 that the values are incremented as the algorithm moves up the line, just as Bresenham suggests, but it keeps the coordinates without rounding them except as needed to make the judgment to which pixel the number should be rounded to, e.g. the rounding is done on the precise value, but the precise value is retained by the system such that once it is incremented, it can be checked again. On pages 95-96 in section 3.6.2 it is taught that slivers present a problem, and suggests on page 96 that a rule such as "draw only pixels that lie interior or on a left or bottom edge" (in this case the case of the bottom pixels is emphasized) would fulfill the recited limitation. Further, on pages 92-94, section 3.6 specifically, the use of a polygon filling algorithm that avoids problems with polygons overwriting each other's pixels is taught an clarified in the context of the Bresenham / midpoint algorithm (pages 96-98).)

Finally, the incremented parameter would be x or y coordinate values for example, wherein the left and right fill styles would merely be the inside of a polygon – e.g. see page 93 of Foley, Fig. 3.23 the right fill style would be the style of the inside of the polygon and the left fill style would be the null areas shown around the polygon. Finally, the "difference between a right fill style and a left fill style of an edge" is a coordinate, as applicant does not claim and applicant's specification does not provide evidence of using something other than a coordinate value in that role (e.g. some kind of RGB value or something similar). Lastly, the procedure of Bresenham is repeated for every edge, so it would prima facie be performed for every edge in a given pixel. Thusly, as shown by claims 2 and 3, the first parameter is nothing more than a fill style or color associated with a particular pixel, which would justify examiner's position that the recited parameter is merely a coordinate.

Applicant's arguments have been noted, and thusly another reference has been applied. The Bresenham algorithms per se only treat pixels as points; however, it is noted that Nakamae expands the concept to include virtual scanlines, wherein each pixel is subdivided into sub-pixels. Therefore, the Bresenham algorithm could be applied without applicant's arguments being valid any longer. Particularly, the filling methods of the Bresenham algorithm would, when applied to the system of Nakamae, be prima facie faster.

Motivation for combination is provided by the fact that Foley is merely serving as a teaching reference, e.g. Crisu teaches *inter alia* the use of the Bresenham algorithm in [0013-0016], and Foley in pgs. 73-81 merely explains how it works and its applications.

Crisu further teaches in [0013] certain points about the operation of the Bresenham algorithm. As stated above, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the methods of Crisu and Bresenham. Motivation for combination with Nakamae is also provided by the fact that Nakamae provides greater resolution by using sub-pixels and using anti-aliasing techniques on that level – see pages 22-24.

As to claim 2, this claim merely recites the changing of a second parameter that clearly could represent changing the other coordinate of the pixel (e.g. the first parameter recited above could be the x-coordinate and the second parameter recited herein could be the y-coordinate). Also, as set forth in the filling algorithm recited in section 3.6 of Foley (pgs. 92-94), clearly the second fill style recited would be that of the area outside the polygon, since obviously the fill style in question is merely the color or texture of pixels inside of one polygon in for example Figs. 3.22 and 3.23(a) and (b) as set forth on pages 92-94. Fill style is nothing more and nothing less than the color and characteristics that a polygon or general screen is covered with. Motivation and combination is taken from the parent claim.

**Examiner is treating claim 3 as being dependent upon claim 2 for the reasons discussed in the claim objections section above. If applicant wishes to dispute this point, applicant should so note in the response to this Office Action.

As to claim 3, the claim of a third and fourth pixel is comparable to Fig. 3.22 on Foley page 92 (as an example). Namely, scan line 8 is illustrated as crossing a polygon. Obviously, there are at least first and second pixels outside and inside the polygon

where the first parameter would be the fill style of the inside of the polygon. The third parameter recited would merely be the coordinates of the edge that intersects the scan line at that point. Applicant's parent claim – claim 1 – states clearly that each scanline has multiple edges. Obviously, such edges would cross the scanline once each, and the third claim thusly requires multiple edges. Thus, each edge would have inside and outside pixels and fill styles, and thusly the recited clause of "for each edge in the third pixel" is nothing more than a recitation of claim 1 for another edge crossing the recited same scanline.

Let the algorithm work as is taught in section 3.6 and as in Crisu [0013-0016] where edge-walking is done for the polygon, such that as on page 92, the scan is walked across, in that each edge that crosses the scanline is noted and the appropriate pixels that belong on it are chosen such that one coordinate is incremented as the algorithm moves across the scanline – obviously, this could be the x or y coordinate (in the case of the image in Fig. 3.22 on page 92 it would the x-coordinate), and obviously the recited third parameter would be the incremental increase in x-position that would be added or incremented to the counter variable holding the x-position on the scanline, which would also the be the recited "second parameter" such that it would mark the occurrence of an edge. Obviously, Fig. 3.22 illustrates that situation where the third pixel would be the point where the scanline crosses the polygon boundary again (e.g. pixels one and two would be found at point a and pixels three and four would be found at point b) and the fourth pixel would be filled with the "second fill style" that would be equal to the x- and y-coordinates of the scanline, e.g. the recited first fill style would be

that of the polygon and the second fill style would be that of the null region or the outside of the polygon as illustrated in Figs. 3.22 and 3.23(a) and (b) and as explained above. Motivation and combination are taken from the parent claim.

As to claim 4, it is merely one claim that contains all the limitations of claims 1-3 above. Therefore, all the limitations of this claim are taught in the rejections to claims 1-3 above, which are herein incorporated by reference in their entirety, and motivation and combination is thusly provided by claim 1 as stated above.

As to claim 2, this claim merely recites the changing of a second parameter that clearly could represent changing the other coordinate of the pixel (e.g. the first parameter recited above could be the x-coordinate and the second parameter recited herein could be the y-coordinate). Also, as set forth in the filling algorithm recited in section 3.6 of Foley (pgs. 92-94), clearly the second fill style recited would be that of the area outside the polygon, since obviously the fill style in question is merely the color or texture of pixels inside of one polygon in for example Figs. 3.22 and 3.23(a) and (b) as set forth on pages 92-94. Fill style is nothing more and nothing less than the color and characteristics that a polygon or general screen is covered with. Motivation and combination is taken from the parent claim.

As to claim 3, the claim of a third and fourth pixel is comparable to Fig. 3.22 on Foley page 92 (as an example). Namely, scan line 8 is illustrated as crossing a polygon. Obviously, there are at least first and second pixels outside and inside the polygon where the first parameter would be the fill style of the inside of the polygon. The third parameter recited would merely be the coordinates of the edge that intersects the scan

line at that point. Applicant's parent claim – claim 1 – states clearly that each scanline has multiple edges. Obviously, such edges would cross the scanline once each, and the third claim thusly requires multiple edges. Thus, each edge would have inside and outside pixels and fill styles, and thusly the recited clause of "for each edge in the third pixel" is nothing more than a recitation of claim 1 for another edge crossing the recited same scanline.

Let the algorithm work as is taught in section 3.6 and as in Wells, as noted above where edge-walking is done for the polygon, such that as on page 92, the scan is walked across, in that each edge that crosses the scanline is noted and the appropriate pixels that belong on it are chosen such that one coordinate is incremented as the algorithm moves across the scanline – obviously, this could be the x or y coordinate (in the case of the image in Fig. 3.22 on page 92 it would the x-coordinate), and obviously the recited third parameter would be the incremental increase in x-position that would be added or incremented to the counter variable holding the x-position on the scanline, which would also the be the recited "second parameter" such that it would mark the occurrence of an edge. Obviously, Fig. 3.22 illustrates that situation where the third pixel would be the point where the scanline crosses the polygon As to claim 3, the claim of a third and fourth pixel is comparable to Fig. 3.22 on Foley page 92 (as an example). Namely, scan line 8 is illustrated as crossing a polygon. Obviously, there are at least first and second pixels outside and inside the polygon where the first parameter would be the fill style of the inside of the polygon. The third parameter recited would merely be the coordinates of the edge that intersects the scan line at that point. Applicant's

parent claim – claim 1 – states clearly that each scanline has multiple edges. Obviously, such edges would cross the scanline once each, and the third claim thusly requires multiple edges. Thus, each edge would have inside and outside pixels and fill styles, and thusly the recited clause of "for each edge in the third pixel" is nothing more than a recitation of claim 1 for another edge crossing the recited same scanline. The boundary again (e.g. pixels one and two would be found at point a and pixels three and four would be found at point b) and the fourth pixel would be filled with the "second fill style" that would be equal to the x- and y-coordinates of the scanline, e.g. the recited first fill style would be that of the polygon and the second fill style would be that of the null region or the outside of the polygon as illustrated in Figs. 3.22 and 3.23(a) and (b) and as explained above. Motivation and combination are taken from the parent claim.

As to claim 4, it is merely one claim that contains all the limitations of claims 1-3 above. Therefore, all the limitations of this claim are taught in the rejections to claims 1-3 above, which are herein incorporated by reference in their entirety, and motivation and combination is thusly provided by claim 1 as stated above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric V. Woods whose telephone number is 571-272-7775. The examiner can normally be reached on M-F 7:30-4:30 alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on 571-272-7664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Eric Woods

Jeffrey A. Brier
JEFFERY BRIER
PRIMARY EXAMINER

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